Draft Recovery Implementation Strategy
for
Sharpnose (*Notropis oxyrhynchus*) and Smalleye (*N. buccula*) Shiner

Photo Credit: USFWS

U.S. Fish and Wildlife Service
Southwest Region
Arlington Ecological Services Field Office
Arlington, Texas

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This Recovery Implementation Strategy (RIS) coincides with the Sharpnose and Smalleye shiner Recovery Plan (Service 2020), and describes in detail how the site-specific, prioritized actions outlined in the recovery plan will be implemented. The RIS also estimates the time and costs to complete recovery. The RIS may be revised at any time during the recovery process, whenever experience and information gained call for a change in tactics, therefore maximizing flexibility of recovery implementation. As used here, "actions" are broad measures that clearly describe what needs to be done to accomplish the goal of long-term viability. "Activities" are the detailed, on-the-ground tactical steps needed to implement the higher-level recovery actions.

Prioritized recovery actions from the Recovery Plan and their associated activities are listed in Table 1. Priority 1 actions and activities are defined as those that must be taken to prevent extinction or to prevent either species from declining irreversibly in the foreseeable future. Priority 2 actions and activities are those that must be taken to prevent a significant decline in population size or habitat quality or some other significant negative impact. Priority 3 actions and activities are all other measures that are expected to provide for full recovery of the species. The assignment of priorities does not imply that some actions and activities are of low importance, but instead implies that lower priority items may be deferred while higher priority items are being implemented. Please refer to Table 1 for a clear association among recovery actions, activities, and the threats they address.

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Acronyms Used:

BBASC	Brazos River and Associated Bay and Estuary System Stakeholder Committee	DMF	Double Mountain Fork (of the Brazos River)
BBEST	Brazos River and Associated Bay Estuary System Basin and Bay Expert Science Team	RIS	Recovery Implementation Strategy
		RRC	Railroad Commission of Texas
BRA	Brazos River Authority	SSA	Species Status Assessment
EPA	Environmental Protection Agency	TCEQ	Texas Commission on Environmental Quality
ESA	Endangered Species Act	TPWD	Texas Parks and Wildlife Department
FR	Federal Register	USGS	United States Geologic Survey
MVP	Minimum Viable Population	USFWS	United States Fish and Wildlife Service

Table 1. Recovery Actions and Activities

PRIORITY[i]	ACTIVITY NUMBER	ACTIVITY / NARRATIVE	POTENTIAL PARTNERS	ESTIMATED COST/YEAR	ESTIMATED TIME (YEARS)	TOTAL COST	INFORMS RECOVERY CRITERIA	ADDRESSES THREAT[ii]
1.0 Ensure adequate stream flows								
1	**Recovery Action 1.1 Preclude the need for new reservoir development within the upper Brazos River basin**		USFWS, TPWD, state partners	$100k	10	$1,000k	1, 3(a), 3(b), 5(a), 5(b), 7(a), 7(b), and 7(d)	1,2,3
	1.1.1	Obtain future projected municipal water demands from additional sources.						
		For example, plausibility of water transportation pipelines from more easterly situated reservoirs as an alternative to withdrawing water from the upper Brazos River basin.						
	1.1.2	Implement water-efficient technologies to reduce groundwater withdrawals.						
		Exploration and research toward applicable water conservation technologies for municipal and agriculture use. For example, soil moisture sensor technology to increase crop yield and maximize water utilization.						
3	**Recovery Action 1.2 Research stream flows within the upper Brazos River basin**		USGS	$150k	2	$300k	3(a), 3(b), 7(a), 7(b), 7(c), and 7(d)	2,3
	1.2.1	Understand how water resource development in the Upper Brazos River basin of Texas quantitatively affects spawning flows needed for reproductive success.						
		Evaluate groundwater-surface water interactions with trends in baseflow and groundwater level, streamflow measurements during spawning, and hydrograph separation, and (2) assess changes in natural flow regime metrics resulting from impoundment (i.e. minimum-flow, high flow pulse, and bank storage metrics).						
1	**Recovery Action 1.3 Develop and implement measures to retain and promote adequate stream flows**		USFWS, TPWD, academia	$100k	3	$300k	3(a), 3(b)	2
	1.3.1	Promote the stream flow recommendations outlined in BBEST 2012, pp. 5-3 to 5-13.						
		Develop and implement a comprehensive approach to drought and water management in the Upper Brazos River basin. BBEST flow recommendations would provide a number of high flow pulses in the upper Brazos River basin during the spawning season benefiting synchronized sharpnose and smalleye shiner reproduction. BBASC recommendations adopted by TCEQ for the upper Brazos River do not follow the recommendations of the BBEST report and provide much fewer high pulse flows. Use information gained from 1.2.1 and 3.3.1 to inform development of improved flow standards.						
2.0 Restore and preserve natural river morphology								

PRIORITY[i]	ACTIVITY NUMBER	ACTIVITY NARRATIVE	POTENTIAL PARTNERS	ESTIMATED COST/YEAR	ESTIMATED TIME (YEARS)	TOTAL COST	INFORMS RECOVERY CRITERIA	ADDRESSES THREAT[ii]
2	**Recovery Action 2.1 Fish passage barrier remediation (≈80% of crossings)**		USFWS	$200k	15	$3,000k	1, 3(a), 3(b), and 5(a)	1
	2.1.1	Improve fish migration and distribution.						
		Priority for barrier remediation is ranked by expected benefits. Barrier remediation priority rankings (high, medium, and low) are based on the expected conservation benefits from either greatly lengthening an un-impounded segment of river or removing a passage barrier for upstream migration of juvenile fish. (See Table 2, Figure 1)						
1	**Recovery Action 2.2 Control salt cedar**		USFWS, TPWD	$500k	20	$10,000k	5(a), 5(b), 5(c), 7(a), 7(b), and 7(d)	2
	2.2.1	Continue and expand efforts to treat salt cedar (*Tamarix* sp.) throughout the upper Brazos River basin with an emphasis on treatment efforts in the headwaters and tributaries of the Double Mountain and Salt forks to reduce downstream spread.						
		Top priority for salt cedar control should be given to the upper portion of the Brazos River (all reaches upstream of Possum Kingdom Lake) with headwaters and tributaries receiving treatment first then following treatments occurring downstream.						
3.0 Maintain a resilient population of both species								
3	**Recovery Action 3.1 Conduct population viability analysis**		USFWS,USGS	$70k	1	$70k	1 and 6	4
	3.1.1	Determine minimum viable population (MVP) for both species.						
		Use results to aid in augmentation, reintroduction, and monitoring recovery efforts.						
2	**Recovery Action 3.2 Monitor populations/distribution**		USFWS, academia	$100k	15	$1,500k	1 and 6	4
	3.2.1	Monitor populations within each management unit to determine if MVP levels are met or exceeded in each recovery unit.						
		Provide technical and/or financial assistance, as needed, to support surveys, monitoring, protection, and management actions. Table 3 lists the suggested sites to continue monitoring for both species. After some recovery activities are implemented it may be necessary to expand monitoring to include other sites with established (or reintroduced) populations.						
3	**Recovery Action 3.3 Research stream length and flow requirements**		USFWS, academia, USGS	$150k	2	$300k	3(a), 3(b), 5(a), 7(a), 7(b), and 7(d)	1 and 2
	3.3.1	Re-evaluate and refine stream length and flow requirements for successful recruitment.						
		Reintroduction of both species into historically occupied river segments, conduct egg dispersal experiments, etc. Use results to inform decisions on captive propagation, augmentation, and reintroduction efforts.						

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2	**Recovery Action 3.4 Develop and implement genetic management plan**		USFWS, TPWD, academia	$150k	3	$450k	1, 2, and 6	4
	3.4.1	Investigate population genetics; including overall genetic diversity between and among management units and inbreeding coefficients.						
		Use results to inform decisions on captive propagation, augmentation, and reintroduction efforts.						
3	**Recovery Action 3.5 Control non-native/invasive aquatic species**		USFWS, TPWD, academia, USGS	$25k	10	$250k	1	4
	3.5.1	Develop and implement public outreach and monitoring programs to remediate the presence of non-native/invasive aquatic species (i.e. gulf killifish) in the upper Brazos River basin.						
4.0 Establish captive breeding program								
2	**Recovery Action 4.1 Develop a comprehensive sharpnose and smalleye shiner captive propagation and contingency plan (CPCP) consistent with the Service's Policy Regarding Controlled Propagation of Species Listed Under the Endangered Species Act**		USFWS	$61.5k	2 (Evaluated at least twice for 20 years)	$123k	1, 2, and 6	4
1	**Recovery Action 4.2 Establish and maintain captive breeding programs for sharpnose and smalleye shiners**		USFWS	$122k	20	$2,440k	1, 2, and 6	4
	4.2.1	Determine and procure facilities, equipment and personnel necessary to house and operate captive breeding program.						
		Communication with National Fish Hatcheries would allow discussion as to the optimal facility to house captive bred individuals (Ex. San Marcos Aquatic Resources Center, Uvalde National Fish Hatchery, Inks Dam National Fish Hatchery, etc.) and to determine efficacies of captive rearing techniques, identify problems, and improve methods.						
	4.2.2	Collect brood stock for captive population.						
		Acquire specimens throughout the currently occupied range, following CPCP guidelines to limit impacts to extant population. Maintain separate samples to maximize genetic diversity unless genetic studies indicate otherwise.						
3	**Recovery Action 4.3 Develop reintroduction plan**		USFWS and state partners	$90k (yr1) + $75k (14 yrs)	15	$1,140	2 and 6	4

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	4.3.1	Develop and implement a reintroduction plan.						
		Plan would inform the U.S. Fish & Wildlife Service's and partners' decisions on how, when, and where to release captive bred individuals back into their historical range where sufficient conditions are present.						
	4.3.2	Monitor all augmentation and reintroduction efforts to determine their effectiveness, identify problems, and improve methods.						
		Provide technical and/or financial assistance, as needed, to support surveys, monitoring, and management actions for release sites.						
5.0 Ensure water quality								
3	**Recovery Action 5.1 Evaluate and establish water quality standards necessary for protection and recovery**		Academia, USGS, USFWS, EPA, TCEQ, BRA	$100k	5	$500k	4(a), 7(c), and 7(e)	3
	5.1.1	Research physical and chemical tolerances on all life stages (egg, larval, juvenile, adult) of smalleye and sharpnose shiners.						
		Use results to assess effects of habitat modification (e.g. dewatering), water quality (e.g. discharge), and climate change on all life stages.						
	5.1.2	Collaborate with stakeholders to modify water quality standards, if necessary, to achieve recovery.						
		Use information gained from 5.1.1 to inform development of improved standards.						
2	**Recovery Action 5.2 Formulate best management practices for water quality protection from point and non-point source pollution**		TPWD, EPA, TCEQ, BRA,RRC	$35k	1	$35k	4(b) and 7(e)	3
	5.2.1	Investigate options for additional treatments to municipal discharges prior to release into Critical Habitat for the enhancement of water quality.						
	5.2.2	Work with stakeholders to enhance avoidance measures that reduce or eliminate the occurrence of hazardous materials within Critical Habitat.						
3	**Recovery Action 5.3 Limit and relocate new and existing municipal outfalls located in Critical Habitat**		USFWS, EPA, TCEQ, TPWD	$10,000k	5	$50,000k	4(c) and 7(c)	3
	5.3.1	Discuss and implement, with stakeholders, the siting for new outfalls (relocation for established outfalls) to be located outside of designated Critical Habitat. Relocate 25% of existing outfalls outside of Critical Habitat. Table 4 – current outfall locations.						
		Prioritize relocation of those outfalls that are most detrimental to water quality for the species.						
		Research and develop alternatives to aid new outfalls in avoiding discharging within designated critical habitat.						

[i]Priority 1 – An action that must be taken to prevent extinction or to prevent the species from declining irreversibly. Priority 2 – An action that must be taken to prevent a significant decline in species population/habitat quality or some other significant negative impact short of extinction. Priority 3 – All other actions expected to provide for full recovery of the species.

[ii]Threats numbering system: 1) River fragmentation; 2) Alteration of natural stream flow regime; 3) Water quality degradation; 4) Population Viability

Table 2. List and location of instream structures with the potential to act as barriers to fish passage. Priority rankings (high, medium, and low) for barrier remediation (Recovery Action 2.1) are based on expected conservation benefits to the species.

Major Barriers						
Longitude	**Latitude**	**Priority**	**Barrier Type**	**Stream Segment**	**County**	**ID**
-101.6231	33.4907	Medium	Road Crossing	North Fork DMF	Lubbock	6a
-101.0031	33.0867	Low	Road Crossing	South Fork DMF	Kent	10a
-100.9998	33.0978	Low	Road Crossing	South Fork DMF	Kent	10b
-100.9117	33.2672	High	Road Crossing	Salt Fork	Kent	10d
-101.3459	33.3562	High	Road Crossing	Salt Fork	Garza	7d
-101.0471	33.3573	Low	Earthen Dam	White River	Garza	9c
-101.0403	33.3513	Low	Road Crossing	White River	Garza	9d
-101.02	33.3111	Low	Road Crossing	White River	Kent	9e
-100.9652	33.2875	Low	Road Crossing	White River	Kent	9f
Minor Barriers						
Longitude	**Latitude**	**Priority**	**Barrier Type**	**Stream Segment**		
-101.5144	33.4563	Medium	Low water Road Crossing	North Fork DMF	Crosby	6b
-101.4905	33.4438	Medium	Low water Road Crossing	North Fork DMF	Crosby	6c
-101.4685	33.4292	Medium	Low water Road Crossing	North Fork DMF	Crosby	7b
-101.4342	33.3753	Medium	Low water Road Crossing	North Fork DMF	Garza	7c
-101.4022	33.3348	Medium	Low water Road Crossing	North Fork DMF	Garza	7e
-101.3883	33.3166	Medium	Road Crossing	North Fork DMF	Garza	7f
-101.3693	33.2892	Medium	Road Crossing	North Fork DMF	Garza	7g
-101.3629	33.2816	Medium	Low water Road Crossing	North Fork DMF	Garza	7h
-101.0119	33.1313	High	Low water Road Crossing	North Fork DMF	Kent	10c
-100.8778	33.094	High	Low water Road Crossing	Double Mountain	Kent	10e
-100.5353	32.9246	High	Pipeline/Low water Crossing	Double Mountain	Fisher	10f

-100.2721	33.3499	High	Pipeline	Salt Fork	Stonewall	10i
-100.2814	33.3679	High	Pipeline	Salt Fork	Stonewall	10h
-100.531	33.1409	High	Low water Road Crossing	Salt Fork	Kent	10g
-101.0509	33.3731	Low	Road Crossing	White River	Garza	9a
-101.0486	33.3616	Low	Road Crossing	White River	Garza	9b
-99.1349	33.469	High	Low water Road Crossing	Brazos	Baylor	13a
Removed Barrier (Kent County Crossing)						
-100.8859	33.0976		Road Crossing	Double Mountain	Kent	27

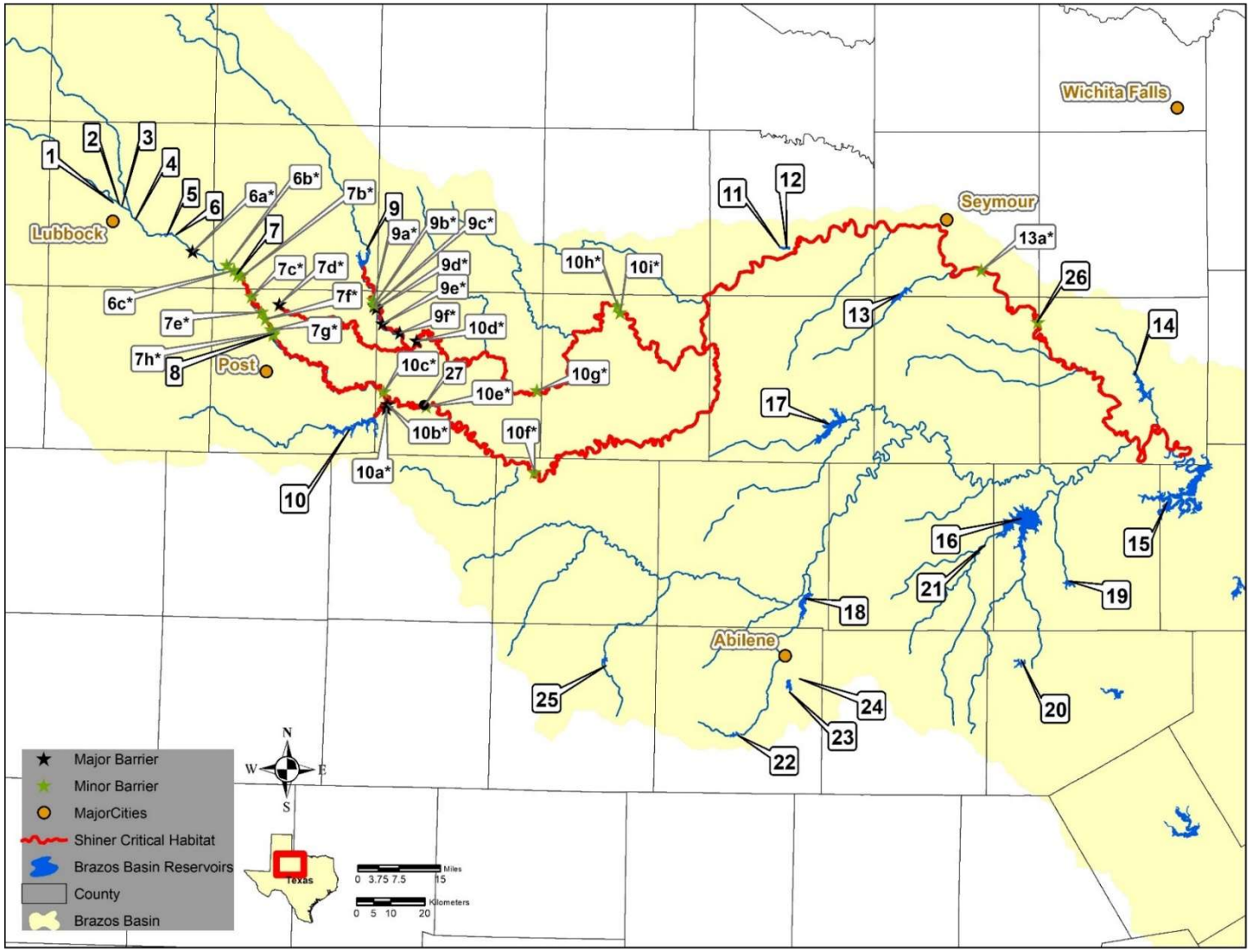

Figure 1. Map of impoundments, reservoirs, fish barriers in the upper Brazos River Basin (modified from SSA, Service 2018). * denotes instream structures with the potential to act as barriers to fish passage.

Table 3. Suggested Brazos River survey sample sites as it pertains to Recovery Activity 3.2. Sites 06, 13, 16, 20, and 21 (in bold, italic font) were sampled monthly to monitor fish population dynamics.

1. Salt Fork, Brazos River Hwy 2008 northeast of Post, TX
2. Salt Fork, Brazos River Hwy 1081 northwest of Clairemont, TX
3. Salt Fork, Brazos River Hwy 208 north of Clairemont, TX
4. Salt Fork, Brazos River Hwy 380 southwest of Jayton, TX
5. Salt Fork, Brazos River Hwy 380 east of Jayton, TX
6. Salt Fork, Brazos River Hwy 83 north of Aspermont, TX
7. North Fork of Double Mountain Fork, Brazos River Hwy 207 north of Post, TX
8. North Fork of Double Mountain Fork, Brazos River Hwy 651 north of Post, TX
9. North Fork of Double Mountain Fork, Brazos River Hwy 380 east of Post, TX
10. South Fork of Double Mountain Fork, Brazos River Hwy 669 south of Post, TX
11. South Fork of Double Mountain Fork, Brazos River Hwy 84 at Justiceburg, TX
12. Double Mountain Fork, Brazos River Hwy 208 southwest of Clairemont, TX
13. Double Mountain Fork, Brazos River Hwy 70 north of Rotan, TX
14. Double Mountain Fork, Brazos River Hwy 83 south of Aspermont, TX
15. Double Mountain Fork, Brazos River Hwy 380 west of Rule, TX
16. Brazos River Hwy 222 west of Knox City, TX
17. Brazos River Hwy 6 south of Benjamin, TX
18. Brazos River Hwy 267 west of Rhineland, TX
19. Brazos River Hwy 266 north of Gore, TX
20. Brazos River at Seymour, TX
21. Brazos River Hwy 79 east of Elbert, TX
22. Brazos River Hwy 380 west of Newcastle, TX
23. Brazos River Hwy 67 south of Graham, TX
24. Clear Fork, Brazos River Hwy 578 Crystal Falls area, TX

Table 4. Description of municipal and industrial discharge facilities into the Brazos River watershed.

TPDES Permit No.	Facility Name	River Segment	Daily Avg Flow (MGD)	Maj/Min	Type	Expiration Date	Effluent Limits (Final Phase)
10487-001	City of Graham	1208	2.1	Major	Dom	May 1, 2017	Flow–Report CBOD–7 mg/L TSS–15 mg/L Ammonia N–2 mg/L E.coli–126 cfu/100 mL pH–6-9 D.O.–6 mg/L
00551-000	Luminant Generator, LLC	1208	505.4	Major	Ind	March 1, 2019	Outfall 001 Flow–505.4 MGD Temp–108 F Free Available Chlorine–0.2 mg/l Total Resid Chlorine–N/A Dissolved Oxygen–Report Outfall 002 Flow–Report TSS–30 mg/L Oil and Grease–15 mg/L Total Aluminum–0.835 mg/L TDS–N/A pH–6-9 Outfall 102 Flow–Report Total Copper–0.5 mg/L Total Iron–1.0 mg/L pH–6-9

TPDES Permit No.	**Facility Name**	**River Segment**	**Daily Avg Flow (MGD)**	**Maj/Min**	**Type**	**Expiration Date**	**Effluent Limits (Final Phase)**
10469-001	City of Throckmorton	1208	0.12	Minor	Dom	May 1, 2019	Flow–Report CBOD–10 mg/L TSS–15 mg/L Ammonia N–3 mg/L E.coli–126 cfu/100 mL pH–6-9 D.O.–4 mg/L
10281-001	City of Seymour WWTP	1208	0.537	Minor	Dom	May 1, 2019	Flow–Report CBOD–10 mg/L TSS–15 mg/L Ammonia N–2 mg/L E.coli–126 cfu/100 mL pH–6-9 D.O.–no requirement
04004-000	City of Seymour R.O. Plant	1208	0.20	Minor	Ind	May 1, 2019	Flow–Report TDS–Report Total Selenium–0.008 mg/L pH–6-9 D. O.–no requirement
10102-001	City of Goree	1208	0.55	Minor	Dom	May 1, 2019	Flow–Report BOD–30 mg/L TSS–90 mg/L E.coli–126 cfu/100 mL pH–6-9 D.O.–4 mg/L

TPDES Permit No.	Facility Name	River Segment	Daily Avg Flow (MGD)	Maj/Min	Type	Expiration Date	Effluent Limits (Final Phase)
10228-001	City of Munday	1208	0.20	Minor	Dom	May 1, 2019	Flow–Report BOD–30 mg/L TSS–90 mg/L E.coli–126 cfu/100 mL pH–6-9 D.O.–4 mg/L
10416-001	City of Knox City	1208	0.20	Minor	Dom	May 1, 2019	Flow–Report BOD–20 mg/L TSS–20 mg/L E.coli–126 cfu/100 mL pH–6-9 D.O.–4 mg/L
13616-001	City of O'Brien	1208	0.02	Minor	Dom	May 1, 2019	Flow–Report BOD–30 mg/L TSS–90 mg/L E.coli–126 cfu/100 mL pH–6-9 D.O.–4 mg/L
10778-001	City of Ransom Canyon	1241A	0.225	Minor	Dom	March 1, 2019	Flow–Report BOD–10 mg/L TSS–15 mg/L E.coli 126 cfu/100 mL pH–6-9 D.O. 4 mg/L Chlorine - 1-4 mg/L

TPDES Permit No.	Facility Name	River Segment	Daily Avg Flow (MGD)	Maj/Min	Type	Expiration Date	Effluent Limits (Final Phase)
10353-002	City of Lubbock (The City of Lubbock has seven outfalls. The only two outfalls identified in the permit that are authorized for direct discharge are 001 and 007, which both discharge through 006. 002 is land applied at the Lubbock Land Application Site (LLAS). 003 is land applied at the Hancock Land Application Site (HLAS). 004 is pumped to the Southwestern Public Service Jones Power Plant for industrial reuse. 005 is authorized for Reuse and is stored in a reservoir until it is reused. 006 is the outfall where both 001 and 007 flow through. Flow from all outfalls are included for the discharge limit of 31.5 MGD but it is unclear from the permit how that number was actually determined.)	1241A	31.5	Major	Dom	March 1, 2019	<u>Outfall 001</u> Flow–Report BOD–10 mg/L TSS–15 mg/L E.coli–126 cfu/100 mL pH–6-9 D.O.–5 mg/L <u>Outfall 002</u> Flow–Report BOD–60 mg/L Cond, mmhos–N/A TKN–Report Nitrate N–Report Ammonia N–Report pH–6-9 <u>Outfall 003</u> Flow–Report BOD–60 mg/L Cond, mmhos–N/A TKN–Report Nitrate N–Report Ammonia N–Report pH–6-9 <u>Outfall 004</u> Flow–Report BOD–Report

							Outfall 005 Flow–Report BOD–Report Outfall 006 Flow–31.5 MGD (report) Outfall 007 Flow–Report CBOD Apr thru Oct–5 mg/L Nov thru Mar–10 mg/L TSS–15 mg/L Ammonia N Apr thru Oct–1.9 mg/L Nov thru Mar–5 mg/L Total Phos–1 mg/L E. coli–126 cfu/100 mL pH–6-9 D.O.–6 mg/L
04599-000	City of Lubbock Land Application Site	1241A	3.0	Major	Ind	March 1, 2019	Flow–3 MGD Nitrate, Nitrogen–N/A Total Selenium - Report
TPDES Permit No.	**Facility Name**	**River Segment**	**Daily Avg Flow (MGD)**	**Maj/Min**	**Type**	**Expiration Date**	**Effluent Limits (Final Phase)**
10353-011	City of Lubbock Water Reclamation Plant	1241A	3.0	Major	Dom	March 1, 2019	Flow–Report CBOD July thru Oct–5 mg/L Nov thru Apr–10 mg/L May thru June–5 mg/L TSS–10 mg/L Ammonia N

							July thru Oct–2 mg/L Nov thru Apr–2 mg/L May thru June–1.7 mg/L Total Phosphorous–0.5 mg/L E. coli–126 cfu/100 mL pH–6-9 D.O.–6 mg/L
10621-001	White River Municipal Water District	1240	0.09	Minor	Dom	March 1, 2019	Flow–Report TSS–25 mg/L
10537-001	City of Plainview	1240	0.33	Minor	Dom	March 1, 2019	Flow–Report CBOD–20 mg/L TSS–20 mg/L Ammonia N–5 mg/L E.coli–126 cfu/100 mL
04935-000	Plainview Bioenergy	1240	0.57	Minor	Ind	March 1, 2019	Flow(avg)–0.57 MGD TSS–20 mg/L TDS–1736 mg/L TOC–55 mg/L Oil and Grease–10 mg/L Total Copper (1)–0.040 mg/L Total Copper (2)–0.036 mg/L Total Selenium–0.016 mg/L Total Zinc–0.289 mg/L
TPDES Permit No.	Facility Name	River Segment	Daily Avg Flow (MGD)	Maj/Min	Type	Expiration Date	Effluent Limits (Final Phase)
10050-001	City of Olney	1231	0.79	Minor	Dom	March 1, 2019	Flow–Report CBOD–7 mg/L TSS–15 mg/L Ammonia N–2 mg/L E.coli–126 cfu/100 mL pH–6-9 D.O.–4 mg/L

All values reported are daily averages for final effluent limitations.

Literature Cited:

Brazos River Basin and Bay Expert Science Team (BBEST). 2012. Environmental flow regime recommendations report. 198 pp.

U.S. Fish and Wildlife Service (Service). 2018. Species Status Assessment Report for the Sharpnose Shiner (*Notropis oxyrhynchus*) and Smalleye Shiner (*N. buccula*) Version 2. Arlington Ecological Services Field Office, Arlington, Texas. 111 pp.

U.S. Fish and Wildlife Service. 2020. Draft Recovery Plan for the Sharpnose (*Notropis oxyrhynchus*) and Smalleye (*N. buccula*) Shiner. U.S. Fish and Wildlife Service Arlington, Texas.